

WHAT IS CLAIMED IS:

1. A method for transmitting, by a user equipment (UE) located in a soft handover region, channel quality indicator (CQI) information bits for informing a Node B of a quality of a downlink channel through a CQI field and a high speed pilot (HS-Pilot) field constituting a subframe of an uplink secondary dedicated physical control channel (DPCCH) in a code division multiple access (CDMA) communication system, the method comprising the steps of:
 outputting a codeword of length 20 by coding the CQI information bits with a code of length 20, which is used when a high speed downlink packet access (HSDPA) service is not supported; and
 permuting 15 coded bits that are coded by the code as a code of length 15, which is used when the HSDPA service is supported, among the 20 coded bits constituting the codeword, thereby locating the 15 coded bits in the CQI field, and permuting the 5 remaining coded bits to be located in the HS-Pilot field.

2. The method of claim 1, wherein when the HSDPA service is provided, HS-Pilot bits are arranged in place of the 5 remaining coded bits permuted in the HS-Pilot field.

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3. The method of claim 1, wherein the codeword b_i of length 20 is output by

$$b_i = \sum_{n=0}^4 (a_n M_{i,n}) \bmod 2, \quad i = 0, 1, \dots, 19$$

where a_n is a CQI information bit, and $M_{i,n}$ is a code of length 20.

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4. The method of claim 3, wherein the 15 coded bits correspond to outputs b_i determined by

$$b_i = \sum_{n=0}^4 (a_n M_{i,n}) \bmod 2, \quad i = 0, 1, \dots, 14$$

where a_n is a CQI information bit, and $M_{i,n}$ is a code of length 20.

5. An apparatus for transmitting, by a user equipment (UE) located in a soft handover region, channel quality indicator (CQI) information bits for informing a Node B of a quality of a downlink channel through a CQI field and a high speed pilot (HS-Pilot) field constituting a subframe of an uplink secondary dedicated physical control channel (DPCCH) in a code division multiple access (CDMA) communication system, the apparatus comprising:

a coder for outputting a codeword of length 20 by coding the CQI information bits with a code of length 20, which is used when a high speed downlink packet access (HSDPA) service is not supported; and

a permuter for permuting 15 coded bits that are coded by the code as a code of length 15, which is used when the HSDPA service is supported, among 20 coded bits constituting the codeword, thereby locating the 15 coded bits in the CQI field, and permuting the 5 remaining coded bits to be located in the HS-Pilot field.

6. The apparatus of claim 5, further comprising:

a controller for outputting a selection signal according to whether the HSDPA service is provided;

a codeword selector for outputting, upon receiving from the controller the selection signal indicating that the HSDPA service is provided, only the 15 coded bits permuted to be located in the CQI field among the 20 permuted coded bits, and outputting all of the 20 permuted coded bits, upon receiving from the controller the selection signal indicating that the HSDPA service is not provided;

a switch for outputting HS-Pilot bits from the HS-Pilot field, upon receiving from the controller the selection signal indicating that the HSDPA service is provided, and discarding the HS-Pilot bits, upon receiving from the controller the selection signal indicating that the HSDPA service is not provided;

and

a multiplexer for multiplexing coded bits for the codeword selector and HS-Pilot bits from the switch.

7. The apparatus of claim 5, wherein the codeword b_i of length 20 is output by

$$b_i = \sum_{n=0}^4 (a_n M_{i,n}) \bmod 2, \quad i = 0, 1, \dots, 19$$

where a_n is a CQI information bit, and $M_{i,n}$ is a code of length 20.

8. The apparatus of claim 7, wherein the 15 coded bits correspond 10 to outputs b_i determined by

$$b_i = \sum_{n=0}^4 (a_n M_{i,n}) \bmod 2, \quad i = 0, 1, \dots, 14$$

where a_n is a CQI information bit, and $M_{i,n}$ is a code of length 15.

9. A method for receiving channel quality indicator (CQI) 15 information bits in a Node B for a code division multiple access (CDMA) communication system when the CQI information bits indicating a quality of a downlink channel are permuted and then transmitted from a user equipment (UE) located in a soft handover region through a CQI field and a high speed pilot (HS-Pilot) field constituting a subframe of an uplink secondary dedicated physical 20 control channel (DPCCH), the method comprising the steps of:

outputting a codeword of length 20 by permuting the CQI information bits transmitted through the CQI field and the HS-Pilot field in an opposite order of the permutation performed by the UE; and

- 25 outputting the CQI information bits by decoding 20 coded bits constituting the codeword into a code of length 20, if a high speed downlink packet access (HSDPA) service is being provided to the UE, and decoding 20 coded bits constituting the codeword into a code of length 15, if the HSDPA service is not being provided to the UE.

10. An apparatus for receiving channel quality indicator (CQI) information bits in a Node B for a code division multiple access (CDMA) communication system when the CQI information bits indicating a quality of a downlink channel are permuted and then transmitted from a user equipment (UE) located in a soft handover region through a CQI field and a high speed pilot (HS-Pilot) field constituting a subframe of an uplink secondary dedicated physical control channel (DPCCH), the apparatus comprising:

a permuter for outputting a codeword of length 20 by permuting the CQI information bits transmitted through the CQI field and the HS-Pilot field in an opposite order of the permutation performed by the UE; and

a decoder for outputting the CQI information bits by decoding 20 coded bits constituting the codeword into a code of length 20, if a high speed downlink packet access (HSDPA) service is being provided to the UE, and decoding the 20 coded bits constituting the codeword into a code of length 15, if the HSDPA service is not being provided to the UE.

11. A method for transmitting channel quality indicator (CQI) information bits for informing a Node B of a quality of a downlink channel through a subframe of an uplink secondary dedicated physical control channel (DPCCH) in a user equipment (UE) located in a soft handover region for a code division multiple access (CDMA) communication system, the method comprising the steps of:

outputting a codeword of length 20 by coding the CQI information bits with a basis vector stream generated by moving 16th and 17th basis vectors in a basis vector stream of length 20, which is used when a high speed downlink packet access (HSDPA) service is not supported, to positions of 1st and 2nd basis vectors and shifting basis vectors in 1st to 15th positions; and

sequentially arranging the 20 coded bits constituting the codeword in a CQI field and a high-speed pilot (HS-Pilot) field constituting the subframe.

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12. The method of claim 11, wherein when the HSDPA service is provided, HS-Pilot bits are arranged in place of the coded bits arranged in the HS-Pilot field.

5 13. An apparatus for transmitting channel quality indicator (CQI) information bits for informing a Node B of a quality of a downlink channel through a CQI field and a high speed pilot (HS-Pilot) field constituting a subframe of an uplink secondary dedicated physical control channel (DPCCCH) in a user equipment (UE) located in a soft handover region for a code division
10 multiple access (CDMA) communication system, the apparatus comprising:

a coder for outputting a codeword of length 20 by coding the CQI information bits with a basis vector stream generated by moving 16th and 17th basis vectors in a basis vector stream of length 20, which is used when a high speed downlink packet access (HSDPA) service is not used, to positions of 1st
15 and 2nd basis vectors in the basis vector stream, and shifting 1st to 15th basis vectors;

a controller for outputting a selection signal according to whether the HSDPA service is provided;

a codeword selector for outputting only 3rd to 17th coded bits constituting
20 the codeword, upon receiving from the controller the selection signal indicating that the HSDPA service is provided, and outputting all of the 20 coded bits constituting the codeword, upon receiving from the controller the selection signal indicating that the HSDPA service is not provided;

a switch for outputting HS-Pilot bits from the HS-Pilot field, upon
25 receiving from the controller the selection signal indicating the HSDPA service is provided, and discarding the HS-Pilot bits upon receiving from the controller the selection signal indicating that the HSDPA service is not provided; and

a multiplexer for multiplexing the coded bits from the codeword selector and the HS-Pilot bits from the switch.

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14. A method for receiving channel quality indicator (CQI) information bits in a Node B for a code division multiple access (CDMA) communication system when the CQI information bits indicating a quality of a downlink channel are permuted and then transmitted from a user equipment (UE) located in a soft handover region through a CQI field and a high speed pilot (HS-Pilot) field constituting a subframe of an uplink secondary dedicated physical control channel (DPCCH), the method comprising the steps of:

- extracting coded bits from the CQI field and the HS-Pilot field of the subframe; and
- outputting the CQI information bits by decoding the extracted coded bits with a basis vector stream generated by moving 16th and 17th basis vectors in a basis vector stream of length 20, which is used when a high speed packet data access (HSDPA) service is not supported, to positions of 1st and 2nd basis vectors, and shifting 1st to 15th basis vectors.

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15. An apparatus for receiving channel quality indicator (CQI) information bits in a Node B for a code division multiple access (CDMA) mobile communication system when the CQI information bits indicating a quality of a downlink channel are permuted and then transmitted from a user equipment (UE) located in a soft handover region through a CQI field and a high speed pilot (HS-Pilot) field constituting a subframe of an uplink secondary dedicated physical control channel (DPCCH), the apparatus comprising:

- a demultiplexer for extracting coded bits from the CQI field and the HS-Pilot field of the subframe; and
- a decoder for outputting the CQI information bits by decoding the extracted coded bits with a basis vector stream generated by moving 16th and 17th basis vectors in a basis vector stream of length 20, which is used when a high speed downlink packet access (HSDPA) service is not supported, to positions of 1st and 2nd basis vectors, and shifting 1st to 15th basis vectors.